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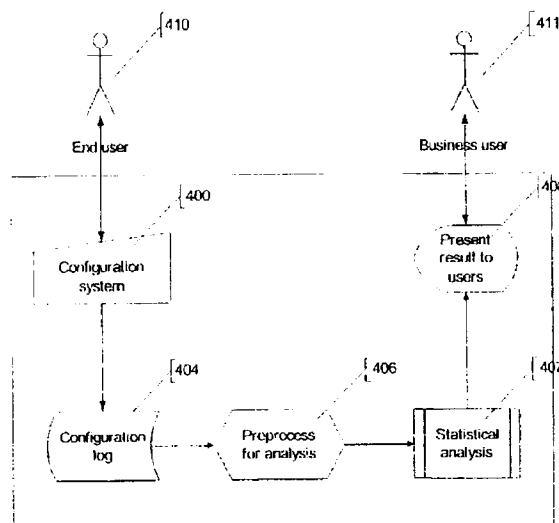
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(54) Title: CONFIGURATION SYSTEM AND A METHOD IN A CONFIGURATION SYSTEM



(57) Abstract: Computer-based configuration system and a method in a computer-based configuration system where an end user is adapted to perform one or many actions during a configuration session in order to configure a product, the system is provided with a configuration log storing means (404) for storing a configuration log comprising one or many configuration log entries, each configuration log entry comprises pieces for identifying the end user, the configuration session and comprises a user action field where data representing an action of an end user is stored. The configuration log entry comprises a configuration state piece (304) adapted to store data representing the result of an user action, wherein configuration state data from a plurality of configuration sessions are used in a data analysis system in order to analyse end users behaviour.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

Title

Configuration system and a method in a configuration system

Field of the invention

- 5 The present invention relates to a configuration system and a method in a configuration system according to the preambles of the independent claims.

Background of the invention

- 10 The present invention relates to the field of sales and product configuration, more specifically, the use of logging to learn more about the needs of the customer.

- Sales configuration is used by sales persons and others to customize complex products for customers needs. Typical complex products areas are manufacturing products, telecom products, data communication products, and financial products like company insurances. A configurator makes it easy to sell complex or customized products. It enables highly interactive selling, where the end user is in complete control. A modern configurator is driven by customer needs rather than solely product attributes. It assists end users in fulfilling their own requirements with suitable combinations of product components. The configurator reacts immediately to any change in the end user's requirements. For example: If a end user specifies she wants a PC to use as a home-studio, the available options for the size of the hard disk change so that small hard disks are not an option.

- Techniques for implementing configurators are described in patent documents WO-97/15886, US-6.002.854, WO-99/13411 and in Tomas Axling et al "A tool for developing interactive configuration applications" in "The second international conference on the practical applications of Prolog", April 1994.

- When a business is using a configurator, it is often the prime sales channel. This means that information from that channel is of prime interest to the business. It is of great importance for the business to have access to information concerning price sensitivity, purchasing disposure in different groups etc. It would be desirable that the business directly can compare customers to lost sales and discover what actions have to be done to make more people interested enough to "cross the border" and become customers. The business would like to

learn more about end users behaviours being e.g. the preferences in different need groups, price sensitivity, clusters of preferred components in different groups etc.

- 5 None of the cited patent documents discuss this matter and the object and of the present invention is to achieve a method and a system adapted to give relevant information to a business concerning end users behaviours, e.g. with regard to price sensitivity, clusters of preferred components in different groups etc.

10 Summary of the invention

The above-mentioned object is achieved by the present invention according to the independent claims.

Preferred embodiments are set forth in the dependent claims.

15

The present invention is based upon the fact that when using a configurator, people leave traces of behaviours and preferences. Giving the companies the availability to that information is to be considered a business advantage.

- 20 This is achieved by the present invention by a computer-based configuration system where an end user is adapted to perform one or many actions during a configuration session in order to configure a product, the system is provided with a configuration log storing means for storing a configuration log comprising one or many configuration log entries. The configuration log entry comprises a
- 25 configuration state piece adapted to store data representing the result of an user action, wherein configuration state data from a plurality of configuration sessions are used in a data analysis system in order to analyse end users behaviour.

30 Short description of the appended drawings

Fig. 1 shows the interaction between the end user and the configurator according to prior art.

Fig. 2 shows an end user interface according to prior art.

Fig. 3 shows a configuration log entry according to a preferred embodiment of

35 the present invention.

Fig. 4 shows a block diagram illustrating the major components of the present invention.

Fig. 5 shows a data flow diagram for the major components of the present invention.

5 Fig. 6 shows a flow chart diagram illustrating how the two types of log entries are created according to an alternative embodiment of the present invention.

Fig. 7 illustrates an exemplary configuration log according to the present invention where each row is a configuration log entry.

10 Fig. 8 shows a diagram illustrating an overview of an implementation of the present invention.

Fig. 9 shows a diagram illustrating how the configuration state can be reconstructed by the pre-processing means according to the present invention.

#### Detailed description of preferred embodiments of the invention

15 Below is a non-limiting listing of exemplary typical architectures for computer applications where the present inventions may be implemented:

- Central application accessed through terminals.
- Stand-alone PC, workstation, PDA applications.
- 20 • Client-server applications, where the workload is split between a client and a server.
- Server applications with thin clients, where typically the thin client is a web browser and the applications are split into one or more layers on one or more servers.

25

According to a preferred embodiment of the present invention, the invention is implemented using "Server applications with thin clients", since this is the most common architecture used today. In the following this implementation is described. However, with minor changes, which are obvious for a person skilled  
30 in the art of construction of software systems, the present invention is also applicable on the other architectures.

Figure 1 shows the interaction between the end user and a configuration system according to prior art. The end user 106 is using the configuration system to

customize or configure a product that consists of several parts. The configuration is started and the end user is presented with questions and calculated values in a user interface 101 (for an example see fig. 2). Some or all of the questions may already been answered. The end user now answers or changes one or several questions 102. If the end user decides that the configuration is finished in 103, the configuration process is ended at 104. Typical ways of finishing the configuration is pressing an order button, or just by leaving this user interface. Otherwise the configurator processes the answer of the end user 105 and updates the display with questions and calculated values 101. The end user looks at the result and the steps are repeated from 101. Going through a number of loops is called a configuration session.

The process described in figure 1 is a feedback loop. The result of an action affects how the end user will answer the next question. Each loop illustrated in the figure as going through 101, 102, 103 and 105 represents an action that may involve answering one or more questions. If only one question is answered, the feedback loop is very tight. The configurator helps the end user with immediate feedback to simplify the customisation of the product.

Fig. 2 shows an end user interface according to prior art and applicable in the present invention where the end user interacts with the process described in figure 1. There are two types of information shown: questions and calculated values. In figure 2 the questions 200 are to the left and the calculated values 206 are to the right. However, these two types of information can be arbitrarily mixed in the user interface. The most common question types are:

- Entering a number 201.
- Selecting from a set in a drop down list 202.
- A boolean question 203, the answer is either yes or no.
- If the set is small, instead of using a drop down list, a set of radio buttons 204 can be used.

The calculated values are mostly numerical values 206, but can also be boolean or a string like "Red". Normally all questions are answered, those questions that

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are not answered by the end user, can be answered by the configurator 205. Thus, the answers of the questions, which are not answered by the end user, are also part of the feedback to the end user. Naturally, the user interface can also contain pictures, where the end user makes a selection by clicking at the  
5 picture, and where the calculated values are illustrated by pictures.

In the preferred embodiment, the end user uses a web browser and the configurator is placed on a server. In order to understand how the end user uses the configurator, logging is used. There are many different versions of logging  
10 format for web servers, two common versions is NCSA Common Log Format (CLF) and Extended Log File Format (ELF). The latter is an improvement of the first to make it more feasible for analysis. An ELF log entry contains all or a subset of:

- date = date in yyyy-mm-dd format
- 15 • time = time in 24-hour format, the machine's time zone
- cs-method = client-to-server HT
- TP Method
- cs-uri = client-to-server requested URI
- sc-status = server-to-client HTTP Status code in the response
- 20 • time-taken = transfer time
- bytes = number of bytes sent
- cs-ip = client-to-server IP address and port of the client
- cs-host = the DNS name or the IP number of the remote client

This log format and other log formats used by web servers like iPlanet, Microsoft,  
25 and Apache all focuses on the transportation aspects of the communication between the end user and the configurator.

These log formats can be used and are used for logging configuration sessions with end users. However, by creating a special log format for configuration according to the present invention, much more can be learned about the end  
30 users behaviours and needs.

The configuration log format makes it possible for a data analysis system to tap into the feedback loop of the configuration process.

Examples of providers of data analysis systems are SAS Institute Inc (NC, USA) and Cognos Incorporated (Ottawa, Canada). Naturally, in-house built analysis solutions may also be used.

- 5 Fig. 3 shows a configuration log entry according to a preferred embodiment of the present invention. During a configuration session one or more configuration log entries are created.

The main pieces of a configuration log entry are:

- 10 • Time stamp 300: All log entries are marked with a time when they were created.
- Transportation 301: Different transportation related aspects, see the ELF-format for examples.
- 15 • User 302: An identifier to identify the end user. If it is a logged-in user, the identity can be used including information of which category the end user belongs to. If the end user is anonymous, a unique identifier can be created for the end user that is stored as a cookie in the web browser. If the cookie is placed permanently in the end users web browser, the same identifier can be used the next time the end user returns to the configurator.
- 20 • Session 303: The session information identifies the configuration session. It is used to see the flow within a configuration session. All configuration log entries within the same configuration session have the same session information.
- 25 • Configuration state 304: The most general configuration state is an exact listing of all the questions the end user answer up to now and all information that has been shown the end user up to now. However, since this in most cases would be too much information, the configuration state normally is simplified and/or compressed to make logging feasible.
- 30 • Action 305: The action the end user made. Typical actions are answer a question with a specific answer, let the configurator calculate the answer, ask for a report or bill of material, ask for help with a specific question or an alternative within a question.



A configuration log entry contains log pieces like time stamp, transportation, user, session information, action used together with the configuration state. The configuration state may either be the previous configuration state, being the configuration state prior to the present action, or be the present configuration state, being the configuration state resulting from the present action.

Thus, the configuration state describes the information the end user has available when an end user action is done together with the end user previous actions within the configuration session. The explicit part of the configuration session is the calculated values, the questions answered by the end-user, and the default answers to unanswered questions. Normally, the explicit part of the configuration state is stored in a configuration log entry once per end user action. The implicit part is the previous configuration log entries. Modern analysis systems can analyse sequences and therefore the implicit part of the configuration state does not have to be stored in the configuration log. The first configuration state is the initial information shown to the end user when starting the configuration.

A statistical analysis system both analyses data within a configuration log entry, and analyses the contents of a sequence of configuration log entries within a configuration session. An example of analysing sequences of log entries according to prior art are click-stream analysis tools, that are used to analyse how end users navigate on a website. This makes it possible to understand the behaviour of the end user and create analysis reports.

Fig. 4 shows a block diagram illustrating the major components and subcomponents of the present invention. The configuration component 400 is responsible for letting the end user make his configuration. During the interaction with the end user entries are saved to the configuration log storing means 404. The analysis component 405 reads the configuration log in the storing means 404, performs the analysis, and presents results of the analysis. The analysis component may either be a totally interactive system, reading the configuration logs as soon as they are created by the configuration component, or it can be batch-oriented, reading analysis daily, weekly or at any other suitable time interval.

According to the present invention the configuration system comprises the configuration component 400 and the configuration log storing means 404.

The configuration component 400 has three subcomponents: client, server, and configuration server. In the preferred embodiment, the client 401 is a web browser, the server 402 is a web server, an application server, or an application.

5 The configuration server 403 is a software component that takes end user requirements and after a number of iterations with the end user returns a suggested customized product. The configuration server can either be a separate component or part of the server. In order to make the presentation of the invention as clear as possible, the server and the configuration server are  
10 separated.

Examples of a web server is Microsoft Internet Information Server (Microsoft Corporation, WA, USA), Apache web server (The Apache Software Foundation, USA). Examples of application servers are IBM Websphere Application Server (International Business Machines Corporation, NY, USA) and BEA WebLogic  
15 (BEA Systems Inc, CA, USA). Examples of an application is a CRM-solution.

The data analysis component 405 has three subcomponents: pre-processing means for analysis 406, statistical analysis means 407, and presentation means for presenting the result of the analysis 408. The preprocessing means 406 is  
20 responsible for transforming the log and adding additional information from other resources so that analysis can be applied. The statistical analysis means 407 uses different statistical methods to analyse the log. The presentation means 408 presents the result of the analysis to those who are interested. In the description of the present invention these are called business users. Previously  
25 the result was presented as reports, now more and more is presented in electronic form over the web or using email.

The analysis component and its subcomponents can either as a whole or partly be created by using programming languages like Java or C++, or be bought from companies like SAS Institute Inc (NC, USA) and Cognos Incorporated (Ottawa,  
30 Canada).

The present innovation is exemplified using thin-client architecture. However, it is straightforward to adapt the present innovation for other architectures. For example, assume that the end users would use a laptop or PDA without any  
35 connection to a server. Then, all the components of the configuration component

would be executed on the laptop or PDA. On each laptop or PDA a local log would be created. These logs would later be sent to a central location and merged into one big configuration log.

5 Fig. 5 shows a data flow diagram illustrating the present invention. It shows the relationship between the components and subcomponents of figure 4. The end user 410 interacts with the configuration system 400. Many end users may use the configuration system at the same time. All interactions are logged in the configuration log 404 so the configuration log will contain log entries from many  
10 end users. The pre-processing means 406 adds necessary data to the log before the log is analysed by the statistical analysis means 407. The result is presented to business users 411 by the presentation component 408. The arrow between 411 and 408 is two-way, since in many cases the presentation is interactive and can be adapted by the business user. The business user studies the analysis  
15 result and may for example recommend changes in product packaging, in product developing and in configuration issues to change the future behaviours of the end users 410. In many statistical systems, the whole data analysis component is one big component, without distinct boundaries between the pre-processing, the analysis and the presentation.

20 The statistical analysis means 407 is not restricted to analyse the configuration log only. It is possible to query OLAP cubes, aggregated tables and logs to create reports. The configuration log is just one part of this data, other data might be information about orders or end users, for example their role, category, location,  
25 income. (OLAP cubes contain multidimensional data.)

According to an alternative embodiment of the present invention there are two types of configuration log entries. Firstly, the ones that are created by the configurator directly, for example when an end user answers a question, which  
30 is described above. Secondly, log entries that are not created by the configurator directly, but that are related to the configuration process. The two types of log entries only differ in the action piece of the log entry.

Two examples of the latter are "asked for help for the question X" and "open up the brochure for item Y in question X". Neither help systems nor document  
35 management systems are a core part of a configuration server. However both are

vital parts of the configuration session. Both help the end user to succeed with the configuration. Thus, to log these actions, and to analyse the configuration log with respect to them is important.

- 5 Fig. 6 shows a flow chart diagram illustrating how the two types of log entries are created. It shows how the logging aspects of one step of a configuration session are handled. The end user 600 looks at his current user interface and makes one (or several) input actions 601. The server checks to see if this is a request to the configurator 602. For example, if the end user uses a web  
10 browser, each possible action of the user will have a different URL. The web server will dispatch on this URL and send the request to the part of the server that wants to handle the request. If it is a configuration request, it is processed at 603 and logged at 604. If it is not a configuration request, it is processed by other parts of the system 605, and if that other system 606 has been set to log  
15 it, it will be logged at 604. In both cases, the end user will be presented with an updated user interface 607. This terminates this step in the configuration session.

- There are two principally different ways of creating the configuration state data  
20 that is input to the analysis system within the scope of the present invention as defined according to the independent claims. Either is a log file created directly that is understandable by the analysis system or a raw log file is created that the pre-processing means makes understandable to the analysis system. Depending on how much work the pre-processing means is allowed to do, the raw log file  
25 can contain more or less information. One extreme would only to log the end user action, and let the pre-processing means redo all configuration steps to create a log. This scenario is further discussed below with references to figure 9. The other extreme is to let the configuration log generated by the configurator contain all the needed information, so that no pre-processing is needed.  
30 Regardless of how the configuration state data is created the important feature of the present invention is that a field of the configuration log entry applied to the data analysis system contains information regarding the configuration state.

- Figure 7 illustrates an exemplary configuration log according to the present  
35 invention where each row is a configuration log entry. It contains a fraction of a

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simple configuration log applicable to be used for analysis. In order to simplify the presentation some internal identifiers have been replaced by understandable texts, for example the product original identifier was "186567", but has here been replaced by the "PC".

- 5 The columns in fig. 7 relates to the configuration log entry of fig. 3 in the following way:

| <b>Fig. 3</b>       | <b>Fig. 7</b>                |
|---------------------|------------------------------|
| Time stamp          | Time                         |
| Transportation      | -                            |
| User                | User                         |
| Session             | Session                      |
|                     | Product                      |
| Configuration state | Calculated Field 1           |
|                     | Calculated Value 1           |
| Action              | Action                       |
|                     | Additional Action Argument 1 |
|                     | Question                     |
|                     | Value                        |
|                     | Success                      |

- 10 In the example in figure 7 the previous configuration state is stored in the log. In this specific case, the previous configuration state is very small, it only contains the price the user saw before the action was done. The columns of figure 7 contains the following information:

| <b>Fig. 7</b> | <b>Description</b>   |
|---------------|--|
| Time          | When the entry was created   |
| User          | The end user   |
| Session       | The current configuration session. An end user can have several active sessions simultaneously |
| Product       | The product or product line that is configured   |
| Action        | The action of the end user.  |

|                                 |  |
|---------------------------------|--|
| Additional Action<br>Argument 1 | 12<br>Additional information needed to describe<br>action  |
| Question                        | The question that was affected by the action   |
| Value                           | The new answer of the question   |
| Success                         | Yes, if the action succeeded, no otherwise.  |
| Calculated Field 1              | In this simple log, previous configuration state<br>only contains the single calculated value "price". |
| Calculated Value<br>1           | The price of the configured product before the<br>action was effectuated.                              |

In this fraction of the configuration log the following actions are used (naturally other actions may be used):

- 5       • Commit: The end user answered the question in column "Question" with the answer in the column "Value".
- Uncommit: The end user ask the configurator to select an appropriate value for the question in column "Question"
- 10      • Aborted: The end user aborted the configuration session and never returned within this session. This action is an example of an action that in some systems has to be calculated by the preprocessor. The preprocessor goes through all configuration entries within a session, and if it just ends abruptly, for example the last entry is not an order, add an "Aborted"-configuration log entry.
- 15      • Report: The end user asked for the report named with the value in column "Additional Action Argument 1"
- Logmsg: Two occurrences, one where the end user requested help for a question, another where the end user ordered the configured product. This is an example of a logging a non-configuration request.

20   Fig. 8 shows a diagram illustrating an overview of the implementation of the present invention. It shows how the business is improved by using the result of the analysis. The business develops new products or improves old products 801. The products are described by product experts and marketing people for the configurator 802. End users can configure and buy the products, described in  
25   the previous step 802, at 803. When the end users configure, their actions are

logged in 804. Analysis 805 is used to understand the behavior and needs of the end users. When the business users understand the behavior they can decide to develop new products that suits the end users better (arrow 805 to 801) or the business users realize that the products can be better described for the end  
5 users (arrow 805 to 802).

A statistical analysis of the log may for example reveal the following information:.

The market responsible of the business will

- identify different groups to target market communication,
- 10 • learn more about component/product preferences in different groups,
- learn about price sensitivity in different groups.

The product staff of the business will

- learn about satisfaction with the product portfolio,
- 15 • learn about requests for different components,
- learn about requested/ordered combinations of different components,
- give feedback to product development.

The configuration staff of the business will

- 20 • identify weaknesses in the existing configuration model,
- identify possible areas to develop the configuration model,
- automate the process of finding adequate initial values by using historical data to continuously change them to "real live facts".

A configuration model for product line describes how the products are  
25 configured. A configuration model is normally created by a product expert, marketing people or a consultant.

Fig. 9 shows a diagram illustrating how the configuration state can be reconstructed by the pre-processing means according to the present invention. In this case we assume that we would like to transform configuration log entries  
30 without configuration state to configuration log entries with the configuration state prior to the action in the log entry.

The steps 901 to 906 are repeated for each configuration session occurring the configuration log. For each configuration log entry in a configuration session the steps 902 to 905 are repeated. In steps 902 and 903, the initial configuration state the end user saw when starting the configuration is created. In step 904  
5 the configuration log entry together with the configuration state is stored into the log. If this is the first configuration log entry in the configuration session, the state from step 903 will be used; otherwise the state from the previous loop created in step 905 will be used. In step 905 the new state is created from the configuration state and the action. This state will then be used for the next  
10 configuration log entry in the configuration session.

There are other variants on how to reconstruct the configuration state. However, they all have in common that the configurator has to redo the configuration. The same work done when the end user was configuring is redone by the pre-processing means.

15

Thus, the present invention relates to a method in a computer-based configuration system for providing data in order to analyse end users behaviour when an end user configures a product during a configuration session. The method comprises the following steps:

- 20 a) storing data representing an end user action in a configuration log entry;
- b) storing data representing the configuration state in a configuration log entry, wherein said data being the result of an end user action during a configuration session, and
- 25 c) applying the end user action data and configuration state data from a plurality of configuration sessions to a data analysis system in order to analyse the end users behaviour.

The present invention also relates to a computer program product that is directly  
30 loadable into the internal memory of a processing unit in a configuration system server. The computer program product comprises the software code portions for performing the method steps of the present invention, when said product is run on the configuration system server.



15

In addition the present invention relates to a computer program product stored on a computer usable medium that comprises a readable program for causing a processing unit in the configuration system server to control the execution of the method steps according to the present invention.

5

The present invention is not limited to the above-described preferred embodiments. Various alternatives, modifications and equivalents may be used. Therefore, the above embodiments should not be taken as limiting the scope of the invention, which is defined by the appending claims.

10

Claims

1. A computer-based configuration system where an end user is adapted to perform one or many actions during a configuration session in order to configure a product, the system is provided with a configuration log storing means (404) for storing a configuration log comprising one or many configuration log entries, each configuration log entry comprises pieces for identifying the end user, the configuration session and comprises a user action piece (305) where data representing an action of an end user is stored, characterized in that said configuration log entry comprises a configuration state piece (304) adapted to store data representing the result of an user action, wherein configuration state data from a plurality of configuration sessions are used in a data analysis system in order to analyse end users behaviour.
2. Configuration system according to claim 1, characterized in that the configuration state piece is adapted to store data representing the configuration state resulting from the action of the previous configuration log entry in the same configuration session.
3. Configuration system according to claim 1, characterized in that the configuration state piece is adapted to store data representing the configuration state resulting from the action of the present configuration log entry in the same configuration session.
4. Configuration system according to claim 1, characterized in that the system comprises input means (102), a presentation unit (101).
5. Configuration system according to claim 1, characterized in that data in the configuration state piece is created by a pre-processing means in dependence of actions in a configuration session.
6. Configuration system according to claim 1, characterized in that data in the configuration state piece that is understandable by the analysis system is created directly during a configuration session.

7. Configuration system according to claim 1, characterized in that data in the configuration state piece is partly created directly during a configuration session and partly by a pre-processing means in dependence of actions in the configuration session.
- 5 8. Configuration system according to any preceding claim, characterized in that an action involves answering one or many questions.
- 10 9. Configuration system according to any preceding claim, characterized in that the configuration state piece is also adapted to store data representing behaviour of the end user not directly resulting from a configuration action.
- 15 10. Method in a computer-based configuration system for providing data in order to analyse end users behaviour when an end user configures a product during a configuration session, characterized in that the method comprises the following steps:
- 20 a) storing data representing an end user action in a configuration log entry;
- b) storing data representing the configuration state in a configuration log entry, wherein said data being the result of an end user action during a configuration session, and
- 25 c) applying the end user action data and configuration state data from a plurality of configuration sessions to a data analysis system in order to analyse the end users behaviour.
11. Method according to claim 10, characterized in that step b) further comprises a sub-step b1) of creating the data that is understandable by the analysis system in a pre-processing means in dependence of actions in a configuration session.
- 30 12. Method according to claim 10, characterized in that step b) further comprises a sub-step b2) of creating the data that is understandable by the analysis system directly during a configuration session.
- 35

13. Method according to claim 10, characterized in that step b) further comprises a sub-step b3) of partly creating the data that is understandable by the analysis system in a pre-processing means in  
5 dependence of actions in a configuration session and partly creating the data that is understandable by the analysis system directly during a configuration session.

14. Method according to any of claims 10-13, characterized in  
10 that the configuration state piece is adapted to store data representing the configuration state resulting from the action of the previous configuration log entry in the same configuration session.

15. Method according to any of claims 10-13, characterized in  
15 that the configuration state piece is adapted to store data representing the configuration state resulting from the action of the present configuration log entry in the same configuration session.

16. Computer program product directly loadable into the internal  
20 memory of a processing unit in a configuration system server, comprising the software code portions for performing the steps of any of claims 10-15, when said product is run on the configuration system server.

17. Computer program product stored on a computer usable medium,  
25 comprising a readable program for causing a processing unit in a configuration system server, to control an execution of the steps of any of the claims 10-15.

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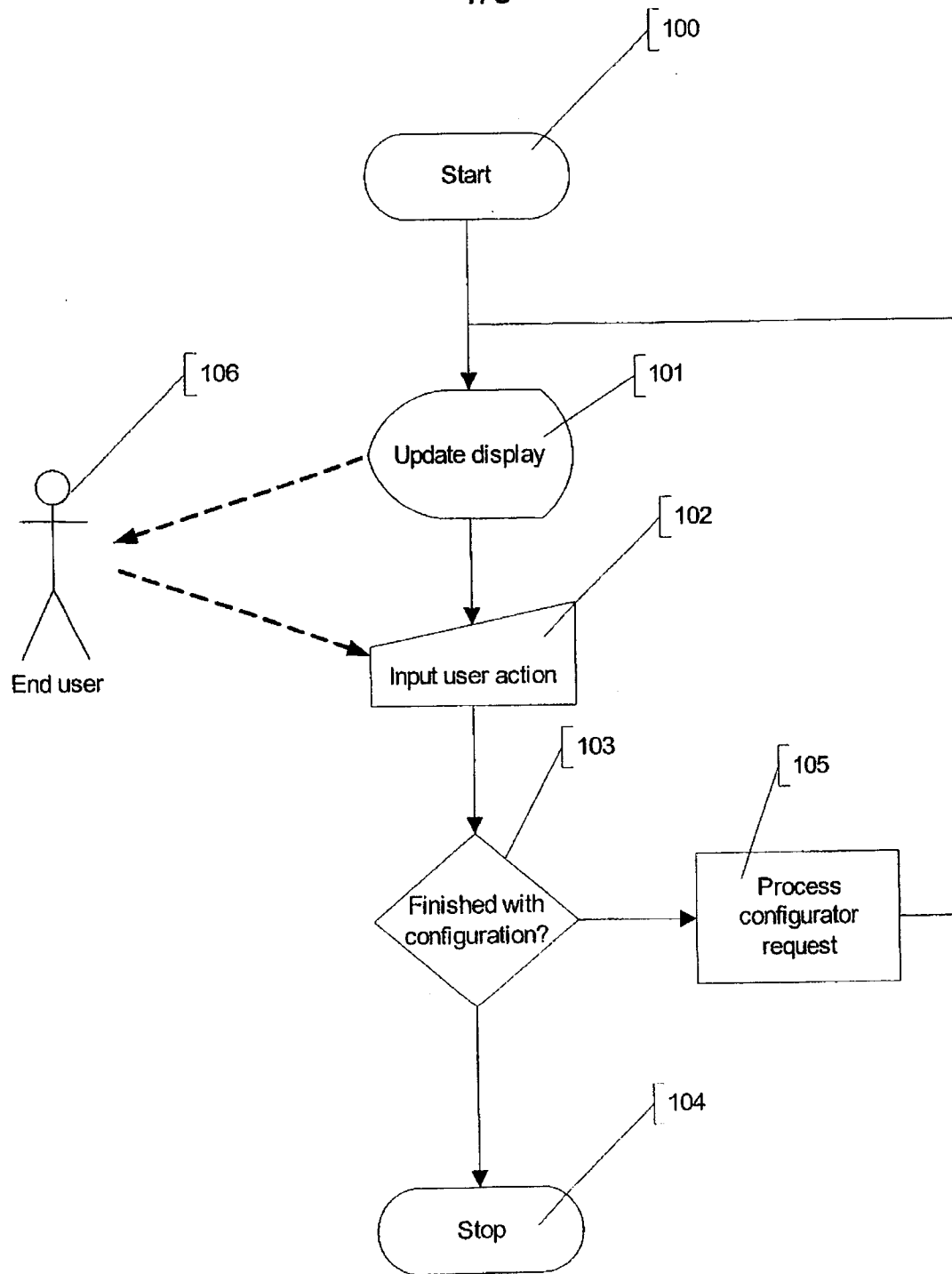


Fig. 1

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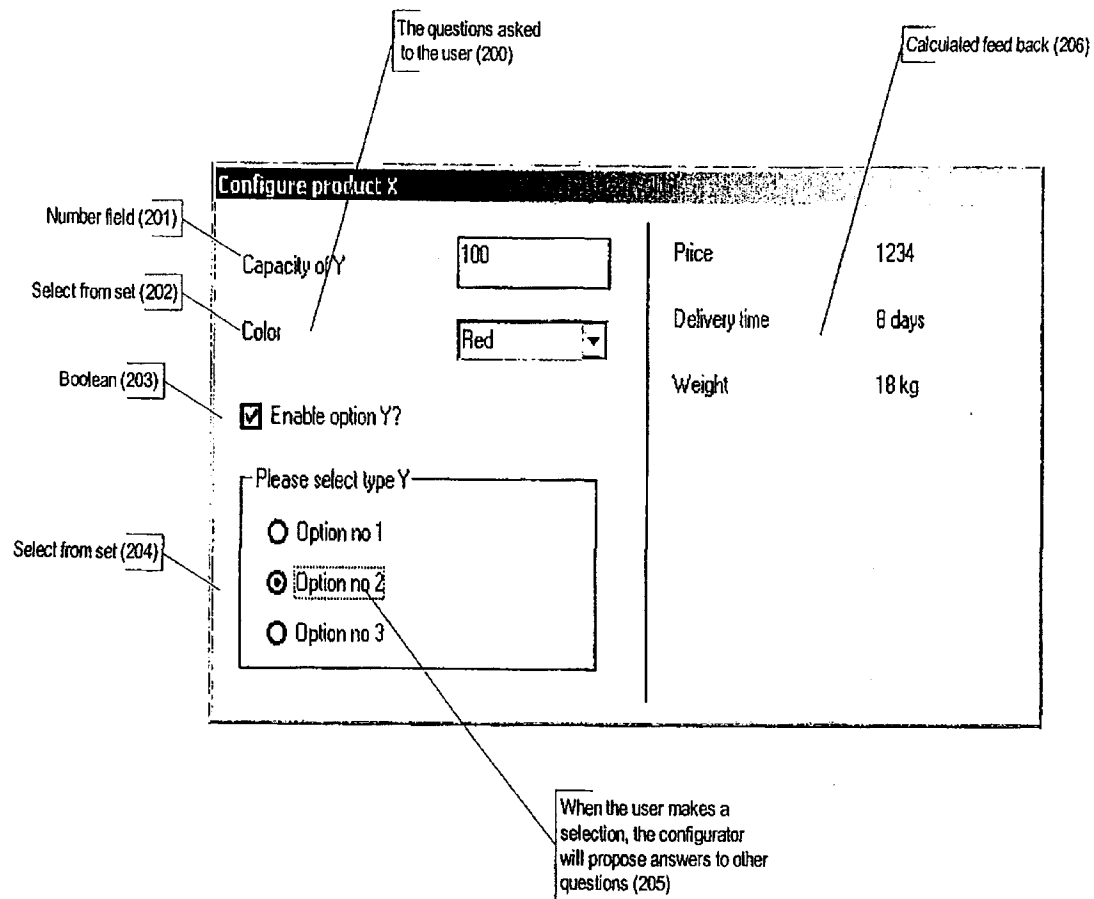


Fig. 2

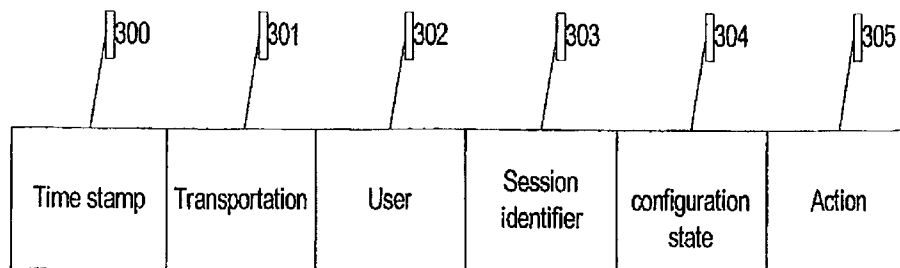


Fig. 3

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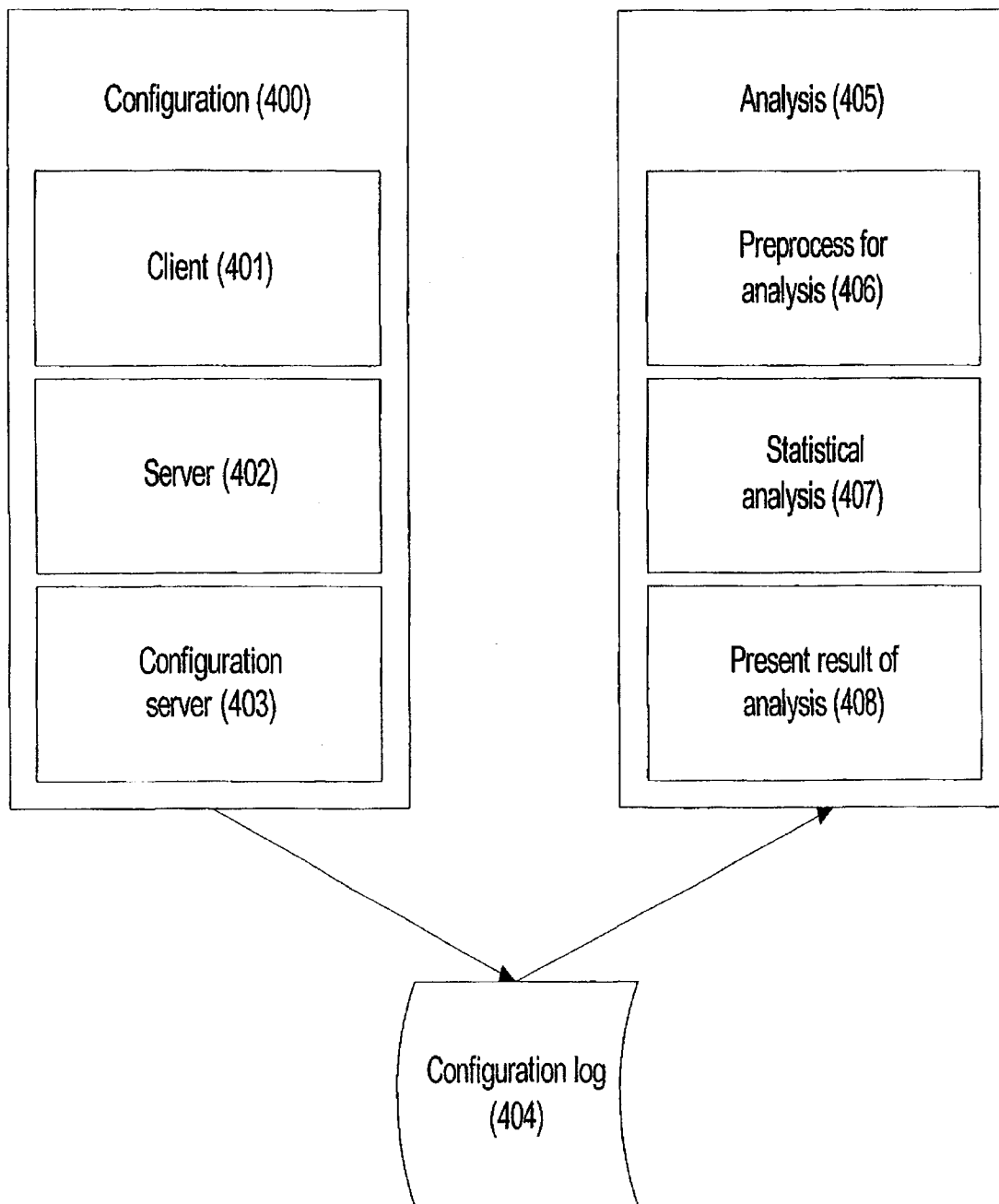


Fig. 4

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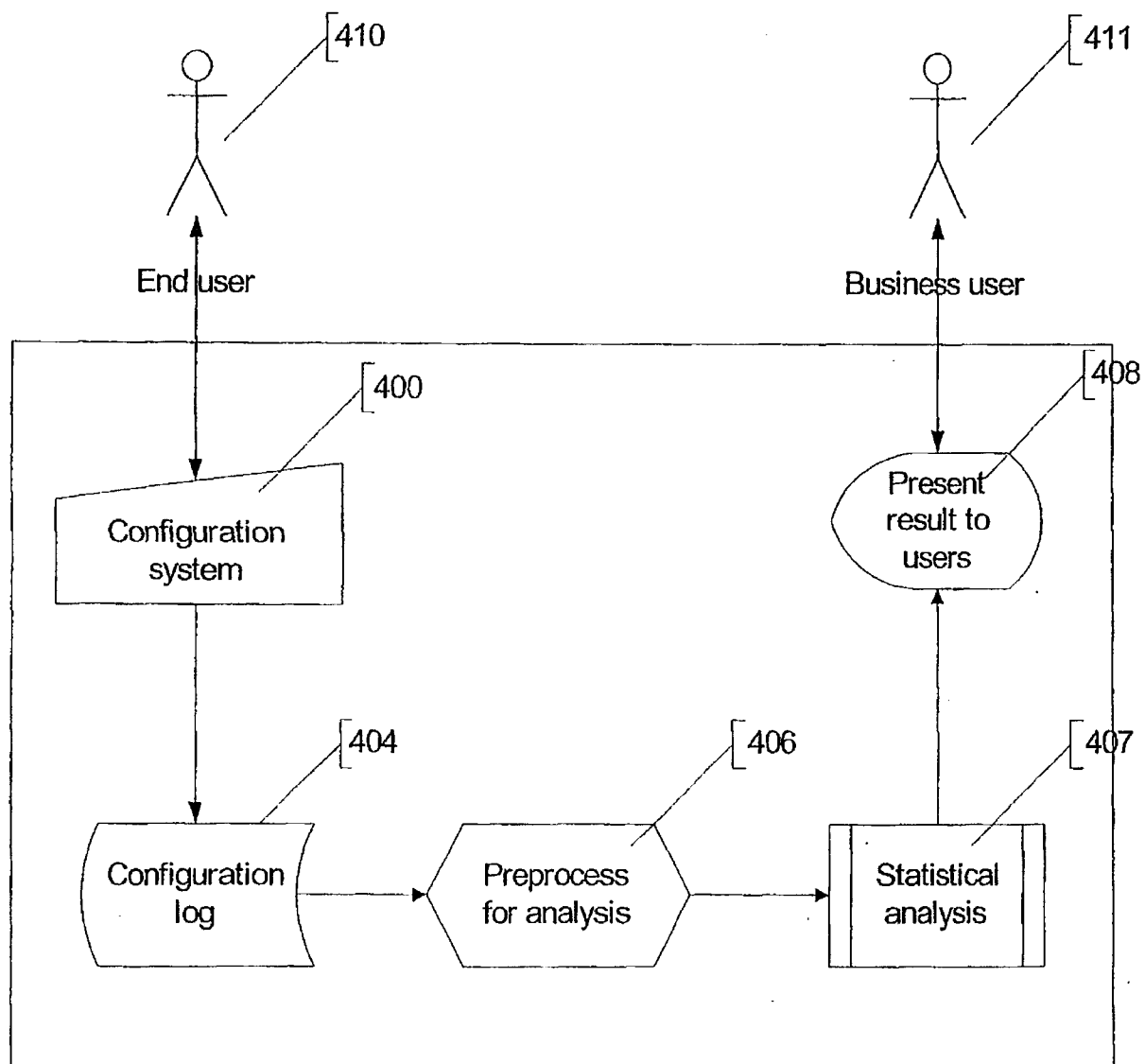
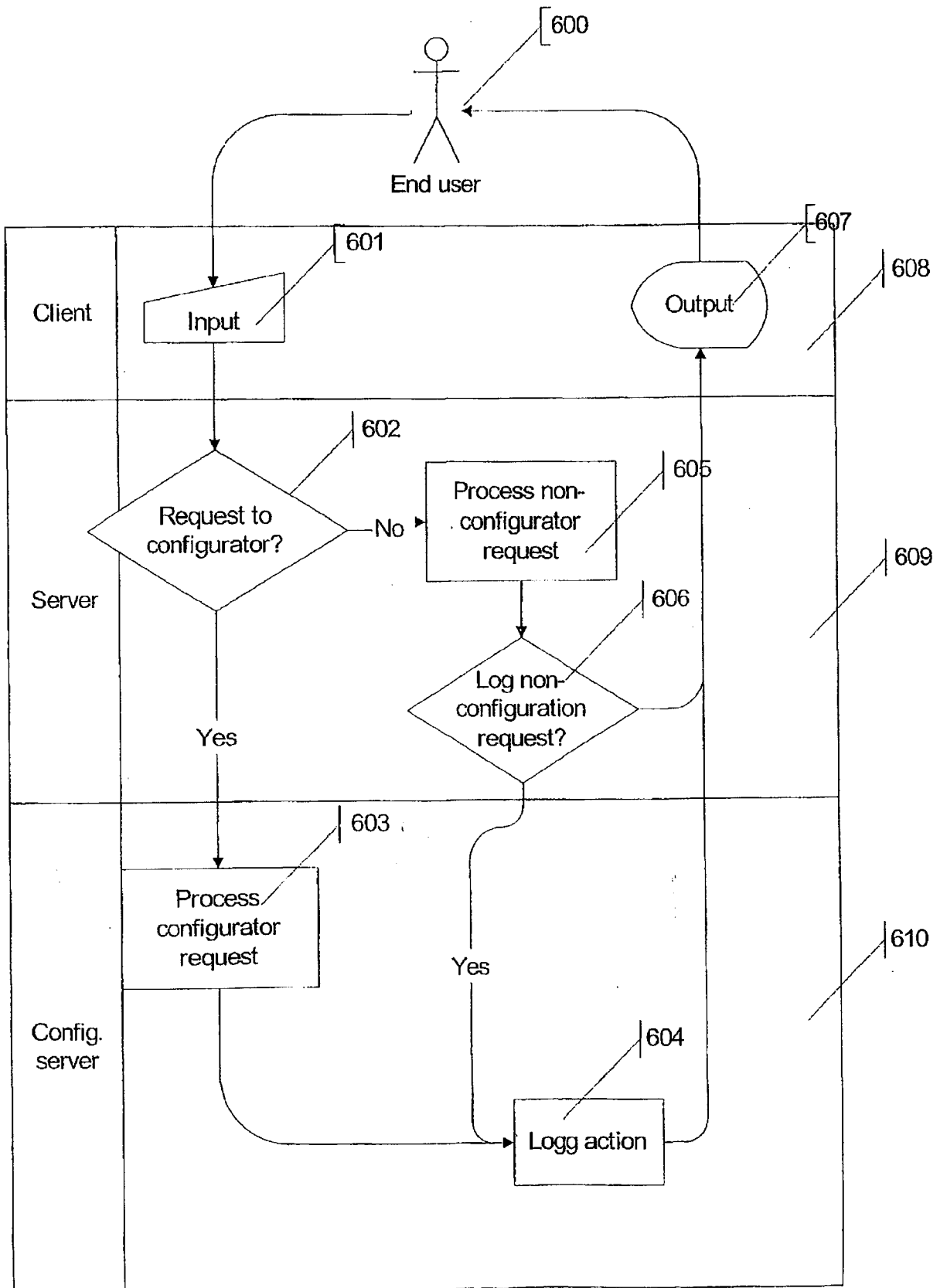


Fig. 5



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| Time             | User      | Session | Product | Action   | Additional<br>Action | Question              | Value   | Success | Calculated<br>Field 1 | Calculate<br>Value 1 |
|------------------|-----------|---------|---------|----------|----------------------|-----------------------|---|---------|-----------------------|----------------------|
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | logmsg   | help                 | Monitor               |   |         | Price                 | 6478                 |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | uncommit |                      | Performance           |   |         | Price                 | 6479                 |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | commit   |                      | Minimum Ram Size      | 32 MB   | Yes     | Price                 | 6659                 |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | commit   |                      | Monitor               | 17 inch Nokia 447XS Short Neck                        | Yes     | Price                 | 9245                 |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | logmsg   | help                 | quality_needs         |   |         | Price                 | 9246                 |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | commit   |                      | Motherboard           | Jetway MB6ZXAS, with builtin Creative Labs 1373 Sound | Yes     | Price                 | 9389                 |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | commit   |                      | Processor             | Pentium II Celeron 333MHz, 128KB Cache, Slot 1        | No      | Price                 | 9389                 |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | commit   |                      | Minimum harddisk size | 12 GB   | Yes     | Price                 | 10888                |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | commit   |                      | Box                   | Miditower 2st 5,25 Inch 3st 3,5 Inch, 200W lownoise   | Yes     | Price                 | 10728                |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | commit   |                      | Loudspeaker           | Speaker 120W with builtin amplifier and powersupply.  | Yes     | Price                 | 10884                |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | uncommit |                      | Minimum Ram Size      |   |         | Price                 | 10694                |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | report   | usercat2             |                       |   |         | Price                 | 10695                |
| 2000-11-24 19:19 | user2923  | 2135421 | PC      | logmsg   | order                |                       |   |         | Price                 | 10696                |
| 2000-11-24 19:19 | user11994 | 2135422 | PC      | commit   |                      | Minimum harddisk size | 10 GB   | Yes     | Price                 | 6890                 |
| 2000-11-24 19:19 | user11994 | 2135422 | PC      | uncommit |                      | Minimum harddisk size |   |         | Price                 | 6479                 |
| 2000-11-24 19:19 | user11994 | 2135422 | PC      | commit   |                      | Processor             | Pentium III 450MHz 512kB Cache including fan          | Yes     | Price                 | 9951                 |
| 2000-11-24 19:19 | user11994 | 2135422 | PC      | commit   |                      | Music                 | No  | Yes     | Price                 | 9951                 |
| 2000-11-24 19:19 | user11994 | 2135422 | PC      | aborted  |                      |                       |   |         | Price                 | 9951                 |

Fig. 7

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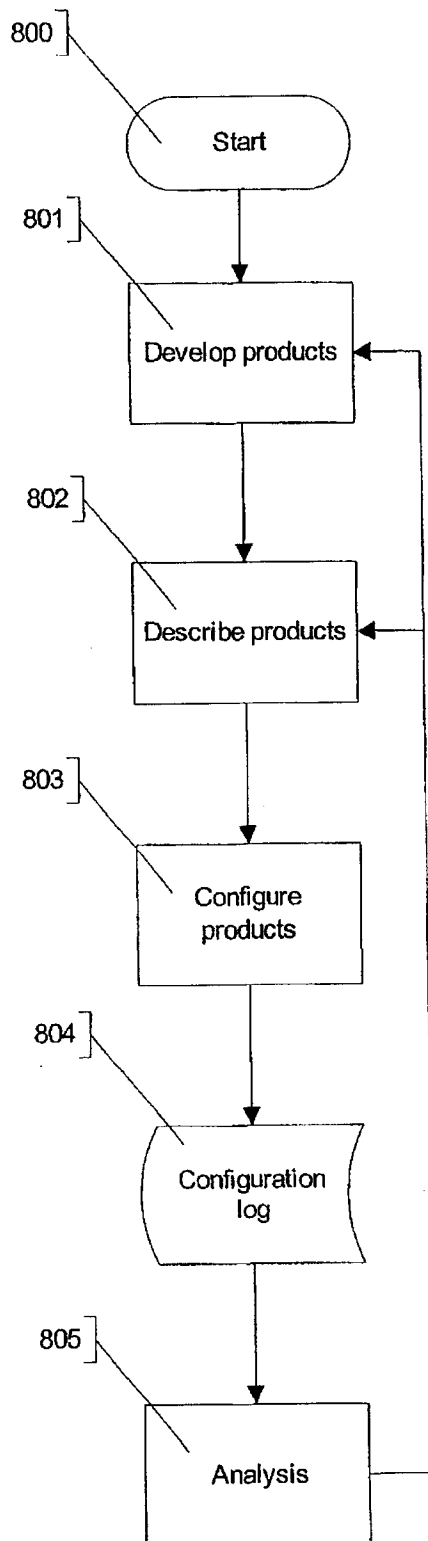


Fig. 8

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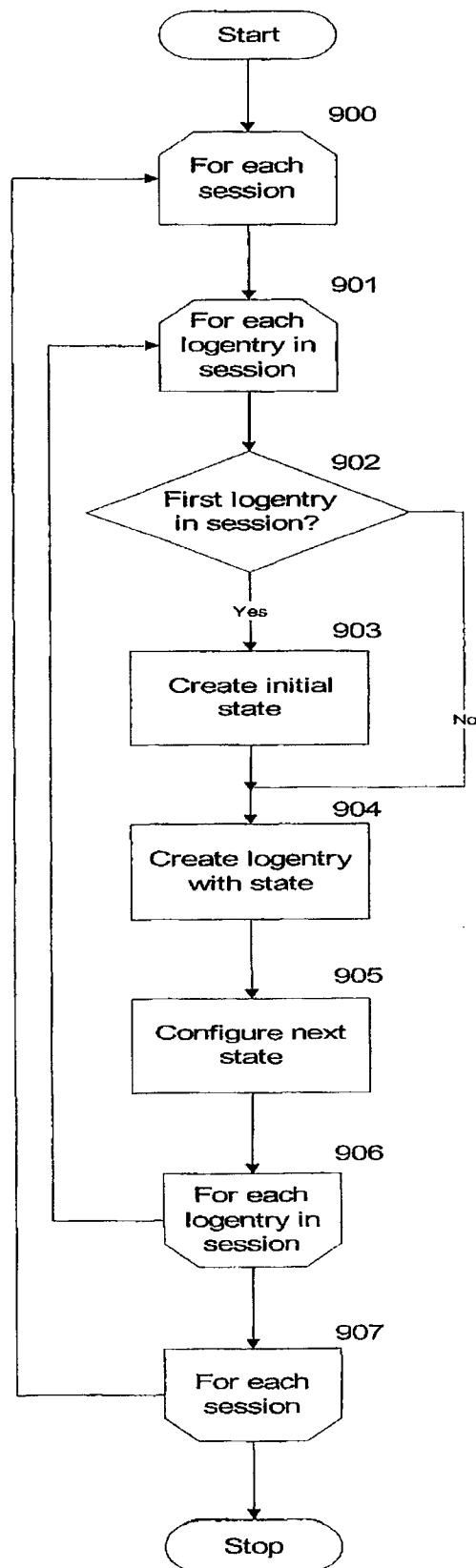


Fig. 9

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 02/00100

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G06F 17/60

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ, INSPEC, COMPENDEX

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. |
|-----------|--|-----------------------|
| X         | ZAYANE, O. et al.: Discovering Web Access Patterns and Trends by Applying OLAP and Data Mining Technology on Web Logs. Proceedings. IEEE International Forum on Research and Technology Advances in Digital Libraries, 1998. Pages 19-29. See page 6, column 2; Table 3 and abstract<br>-- | 1-17                  |
| X         | HOLLFELDER, S. et al.: Mining User for Resource Prediction in Interactive Electronic Malls. Proceedings of International Conference on Multimedia and Expo, 30 July - 2 Aug. 2000, vol.2, pages 863 - 866. See page 2, column 2, line 1 - 12 and abstract<br>--                            | 1-17                  |

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

\* Special categories of cited documents:

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3 May 2002

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06 -05- 2002

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 02/00100

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|-----------|---|-----------------------|
| P,X       | EP 1139262 A2 (FORD MOTOR CO), 4 October 2001<br>(04.10.01), figure 3, claims 1-5, abstract<br><br>--   | 1-17                  |
| A         | BÜCHNER, A.G. et al.:Discovering Internet<br>Marketing Intelligence through Web Log Mining.<br>ACM SIGMOD Record, vol.27,No.4, Dec.1998, pages<br>54-61. See page 3, line 2 - line 5, fig.3 and<br>abstract<br><br>-- | 1-17                  |
| A         | US 6151601 A (PAPIERNAK, K.A. ET AL.),<br>21 November 2000 (21.11.00), figure 22,<br>abstract<br><br>--<br>-----  | 1-17                  |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/SE 02/00100

| Patent document<br>cited in search report |         |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|---------|----|---------------------|----------------------------|---------------------|
| EP  | 1139262 | A2 | 04/10/01            | EP 1139263 A               | 04/10/01            |
|   |         |    |                     | EP 1139264 A               | 04/10/01            |
|   |         |    |                     | EP 1146465 A               | 17/10/01            |
| <hr/>                                     |         |    |                     |                            |                     |
| US  | 6151601 | A  | 21/11/00            | NONE                       |                     |
| <hr/>                                     |         |    |                     |                            |                     |

Form PCT/ISA/210 (patent family annex) (July 1998)





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11 February 2009

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Kanagawa, 221-0045 JAPAN

**VIA FACSIMILE - LETTER ONLY**  
**MAIL CONFIRMATION**

Re: Nawamura et al. U.S. Patent Application No. 12/365985  
For "Skin-Whitening Method Using Pleurotus Nebrodensis"  
Your Ref.: SS2619; Our Ref.: IWI-16546.002

Dear Mr. Iwahashi:

Thank you for your letters of January 16, 2009 with regard to the above matter. As requested, enclosed for your files please find a copy of the Transmittal Letter, application, Preliminary Amendment and Data Sheets. The application was filed on February 5, 2009 and was assigned Serial No. 12/365985.

Also, the Assignment in the above application has now been electronically recorded in the U.S. Patent and Trademark Office on February 5, 2009 at Reel 022209, Frame 0845. Enclosed please find an electronic receipt of such recording.

Lastly, enclosed you will find our invoice for services rendered to date.

I will be sure to keep you informed of any developments in this application. In the meantime, please do not hesitate to contact me if you have any questions or if we can be of any further assistance.

Very truly yours,

**Rankin, Hill & Clark LLP**

Kenneth A. Clark

KAC:kak  
Enclosures